



FGL Community

NEWSLETTER

SPRING 2022

As the cold wind sweeps away, nourishing warm air blankets the city of Sendai. As the soft wake up call signals Mother Nature to begin anew, we are also preparing for the new semester of the new academic year.

We are looking forward to gathering again and enjoying the blooming sakura together (albeit the allergies). While the situation of the borders is still being closed despite no evidence of aiding the infection rate, we always have our fingers crossed for the day that we can hold physical events like we used to do.

In the meantime, we hope all of you, wherever you are, are physically and mentally well prepared for the upcoming semester. Please grab your morning drinks, and enjoy what we present for you in the first newsletter of the academic year 2022.

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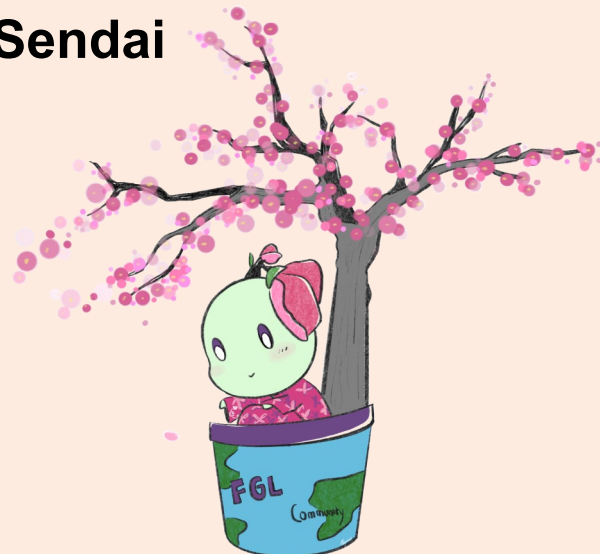
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Mascot Design by Sera

ASK SENSEI

Prof. Marcin Schroeder



Interviewed by Rawin and Sarika

Marcin Schroeder is a professor who specializes in Mathematics and Theoretical Physics. He is currently a part of the General Education department of the FGL Program, and currently teaching mathematics courses to FGL students. This interview, we will find out what experiences he had in the past before joining the FGL program and how he chose to follow his passions.

BACKGROUND

Early Days

I was fascinated by the mystery of numbers when I was a child. One of my earliest memories was my struggle when I was four or five to understand how my parents found out that the scribble like 2 is two of something and 4 is four of something. I could count but not write and I tried to count strokes. This did not work. The more I tried, the more desperate I was. Finally, my father told me that 2 is just a name that all people agreed to give to two of something and that there is no special reason for this. The same way as in my name Marcin there was nothing that tells about me. There were many different boys with the same name. For a while I was happy and I simply memorized the scribbles and the rules on how we form their combinations.

I don't think this early struggle with the magic of numbers, or rather what I learned later was the magic of abstraction, influenced my future. There was no magic in mathematics being the simplest subject of my education. I simply was very lucky to have excellent math teachers. They all were demanding but fair. They did not promise an "easy way" to success. They gave me tools for mathematical thinking (logic, precision, ability to control my reasoning), they challenged me to try solving difficult problems, and let me choose the direction of my study fitting my interests. They never told me that something is easy but rather let me experience the satisfaction when I realized that something that initially seemed very difficult at some point turned out to be easy for me. So, they developed full confidence in my mathematical abilities. I never felt intimidated by math.

However, I did not plan to be a mathematician. In my high school time I wanted to be a painter. I painted a lot and I studied the history of art. My parents worried about it and tried to persuade me to study science. It wasn't a very attractive direction of study for me. I liked philosophy but philosophy could be only a second major.

After I read "Physics and Philosophy" by Werner Heisenberg I started to think about studying physics. The ultimate reason for the decision to take entrance examinations in this field was my laziness. In the Art Academy, the most important part of the entrance examination was drawing of a human body. I knew that almost everyone was failing at the first attempt and practically nobody passed without extensive lessons in drawing offered by professional artists. So, I decided to apply to the Physics Department where I did not have to waste my vacation time for preparation.

ASK SENSEI #2

Prof. Marcin Schroeder

The Difficult Choice

When I was a physics student I went through another temptation. I became interested in theater. I even started my own theater group. The critical moment came when a famous avant-garde theater of Grotowski held auditions. I was accepted but under the condition that I drop my study of physics. I had to be completely dedicated to my theater work. It was my third year at the university and my study just started to be really interesting. My main objective in the study of physics was to understand quantum mechanics and I thought I started getting some understanding of it (in hindsight I know that it was an illusion). I had one week to make the decision. It was a torture. Finally, I decided to stay at the university. It wasn't so much a victory of wisdom, but rather my rebellious personality. I didn't want to be told what I am supposed to do.

This wasn't the last time in my life that I had to make decisions which could change my life completely. But for a while the direction was clear. I received my M.Sc. in Theoretical Physics and became a young faculty in the Institute of Theoretical Physics of the University of Wroclaw (my home city), Poland. I was working on my Ph.D. Dissertation, but my superiors complained that what I presented at seminars is not really physics but rather mathematics. At that time the subject of my research, so called quantum logics, seemed exotic for more conservative (and of course influential) senior faculty of my Institute. Within the next ten or fifteen years it became a commonly accepted part of physics and the interest in quantum computing secured the recognition of its importance. In 1980 my presentations at seminars were perceived as heresy. So, I moved to the Institute of Mathematics of the Technical University of Wroclaw. This was a happy time when I could find more understanding and appreciation of my research.

However, soon the political situation in my country became complicated. It was the time of the Solidarity movement that I joined enthusiastically. After one and half years of freedom and hope the movement was crushed by the Martial Law imposed by the military government pressured by the USSR. For several years I was more engaged in the underground resistance than in research with occasional short term stints in jail for participation in demonstrations. Finally in 1987 I left Poland for the U.S. This was another difficult decision. The regime allowed those blacklisted to leave with the understanding that this is a "one-way ticket". I knew that the regime would fall, but I did not know that so soon (in 1989). So, I had to be prepared that I am leaving for many years.

Aftermath

Then my life got back on the normal track. I defended my Ph.D. in Mathematics, worked at some American Universities and in 1993 I decided to join the faculty of the Minnesota State University at Akita (MSU-A) in Japan for one year. This one year stretched to ten years until MSU-A closed. Then, I was hired to work on the preparation for the new Japanese International University known now as Akita International University (AIU). After one-year preparations AIU opened in 2004 and I was appointed as its Dean of Academic Affairs. The next dozen years was the most fascinating time of my life as I had a unique opportunity to assist the founding President of AIU late Dr. Mineo Nakajima in the process of designing and building this new university. We managed to rise its status from the unknown, new, and exotic higher education institution to the university ranked tenth in Japan. Several educational methodologies pioneered at AIU gradually became the standard in Japan.

ASK SENSEI #3

Prof. Marcin Schroeder

Getting Into FGL ?

After 15 years of work at AIU when I was approaching the retirement age I started to dream about some new experiences. I was pleased to have an opportunity to join the FGL faculty. AIU was designed as a Liberal Arts University with limited curriculum in science and mathematics. Teaching at Tohoku University offers me the opportunity to teach more advanced courses in mathematics to excellent FGL students. I could see why TU is ranked as number one in Japan. I am happy to make some contribution to its success. I like to work with students. I had a lot of fun offering last September an intensive seminar "Can Machine Think?" We had many long-lasting discussions on the subject of natural and artificial intelligence. My students in this seminar were very impressive and I was really impressed by their research papers concluding the seminar.

Hobbies ?

I am in this happy situation that my work is my hobby. My research is in mathematics, information science, artificial and natural intelligence, unorthodox computing, and in philosophical aspects of these domains. If I could afford not working and doing whatever I want, I would have done exactly the same (except maybe during faculty meetings when they are in Japanese as my Japanese is weak). However, I have some other hobbies. I love skiing in winter, hiking in the mountains in summer, and photography all year.

Advice For FGL Students?

I am always puzzled by people who enthusiastically work on solving sudoku problems but who claim that they don't like mathematics. I don't tell them that they actually solve mathematical problems. They may lose their enthusiasm. I can find another analogy in working out in the gym. You build your muscles. When you solve math problems you build your "mental muscles". To study math is to develop the ability of abstract thinking. It is not about memorizing definitions and theorems. You will forget most of them eventually. It is important to develop the skills in solving problems and in finding ways to overcome the complexity which we encounter in our life and work. The abstraction in mathematics is building bridges between diverse domains of knowledge. Don't consider it a ballast but rather an opportunity to lift you to a higher level of understanding. I will finish with what I wrote at the beginning. My kindergarten struggle with understanding numbers was the result of the difficulty in grasping the idea of abstraction. I was lucky that thanks to my teachers I managed so early to overcome the fear of abstraction. This allowed me to feel at home in mathematics all my life.

ALUMNI TALK

Last October, on the 23rd, FGL Community managed to get one of the first generation of FGL—Wijak Yospanya-senpai—to give us slivers of insight into various aspects of his academic journey on the first FGL Community Alumni Talk. From those, he shared things that he deemed important for current FGL students, particularly on what they should do and prepare for the future.

Before the event, various questions were gathered among the FGL students. From this, Wijak-senpai managed to clear up the confusions they had. This was also supported by the discussion session that we had after Wijak-senpai's presentation. Wijak-senpai—and us—was super delighted that the participants had many interesting questions that are relatively hard to find trustable sources.

Here is what Wijak-senpai had said about the event:

“For the feedback, I enjoyed discussing with everyone, and I found that many of you are active and had many questions. This was the first time, so I tried to generalize into different pathways. It would be very interesting if you could take on different alumni with their own respective different specialties in the future.”



In case you missed Wijak-senpai's presentation, feel free to scan the QR code to the next :



Research From Alumni

Dr. Parichat Wetchayont

“Future Drought Projection Under Climate Change Using SPI”

Interviewed by TK and Ryan

These days, the subjects found in science are getting deeper and more specific. One of the examples of these is the study of climate change and how our measurements can be used to approximate or estimate the climate and its progression. Our alumnus, Dr. Parichat Wetchayont, who received her PhD from the Department of Geophysics of Tohoku University, is one of those people who does research in these fields. She truly believes that the importance of her work is ever increasing, especially since the current state of the world climate is undergoing rapid and urgent changes.

Why do you choose and start to do research in this field?

My interest stays the same as when I was still studying for my doctoral degree. As such, it extends to the paper I have done. However, this paper will focus on the drought phenomena in Thailand because in that year, Thailand faced tremendous effects from the drought. Climate change also changes the predictability of the drought season in Thailand, which becomes the main focus of this current project. In this project, the SPI index, CMIP-5, and the HadGEM2 become the center of attention.

What is the SPI index?

The Standardized Precipitation Index (SPI) is an index that indicates the change of precipitation amount from standard value (which is different in different places). In turn, the index can indicate behavior of a certain region's precipitation rate. Therefore, we can use this index to characterize meteorological drought, and help provide subjective indication as to the progression of the drought in future timescales. In this project, we aim to use the cumulative of one month's worth of precipitation as the initial calculation.

Research From Alumni #2

Dr. Parichat Wetchayont

“Future Drought Projection Under Climate Change Using SPI”

Interviewed by

How are you approaching the problem?

First, we need to understand the importance of the quantity of carbon dioxide (CO₂) in our air. Since the CO₂ quantity in our air has a tendency to increase, this results in the tendency of the overall temperature to increase. This molecule has a property to keep heat and the hotter it is, the more drops of water can be kept, which also means that lesser precipitation will come.

This comes to CMIP-5, specifically from model HADGEM2-ES, which predicted 450 ppm CO₂ precipitation and the ECMWF, which is the raw data of the precipitation data. First, the comparison between the two is plotted and a relation is extracted. This is so that we can connect the real-world data to the model, making the conversion between the two mutually applicable. After that, bias correction is done to make the conversion as appropriate as possible before final application.

CMIP-5 = The WCRP Coupled Model Intercomparison Project - Phase 5

It is a world-wide project that runs each participant's model to predict the future climate change, and HADGEM2-ES is one of these models that originated from the United Kingdom.

HadGEM2 stands for the Hadley Center Global Environment Model version 2. The HadGEM2 family includes a coupled atmosphere-ocean configuration, with or without a vertical extension in the atmosphere to include a well-resolved stratosphere, and an Earth-System configuration which includes dynamic vegetation, ocean biology and atmospheric chemistry.

So then how do SPI and HADGEM2-ES connect?

So now we are moving to predict using the HADGEM-2ES and applying it to a related area in Nakhon Nayok Province, Thailand. With the calculation of SPI, we can predict how many droughts and floods may happen between 2020-2040. In addition, it combines climate analysis with the El Niño index to also include spatial (area) coverage of the area we are interested in.

Conclusions

As we can see, this kind of science deals with raw data and statistics calculation which can prove very useful and can be used to anticipate the future. This time, it's a drought phenomenon in Thailand, however the applications of the same concepts can be applied to so many other things that will prove useful in revealing the path on which we strive to prevent further environmental damage.

What to do during **SPRING** in Sendai ?

written by Wei-Wei

Speaking of spring in Japan, the most famous activity must be Hanami, which is usually known as cherry blossom (Sakura) viewing. However, except for Hanami, do you know that there are various kinds of events in this season? Let us explore some of them that are held in Miyagi prefecture!



Walk along Zao echo line road in spring season !

It is known that the ski resort in Zao area is famous in Miyagi. Even after the winter season, there are still some beautiful places worth visiting. For example, the snow wall that will appear after the snow removal of Zao echo line is a case. Before the road opens for the cars to drive on, it will open for the visitors to come and walk along the road to experience how breathtaking the scale of the snow wall is. Regarding the means of transportation, you can only take the bus to visit this place. The detailed information can be found online! (Resource: Travel to Tohoku)

Sendai Aoba Festival is one of the three biggest festivals in Sendai. This festival is held for 2 days. The first day is called yoimatsuri (宵まつり), while the second day is called honmatsuri (本まつり). On the first day, Sparrow dance (すずめ踊り) is the main event and even the tourists can join the group to dance together. On the second day, we can see the samurai parade, mikoshitogyo (神輿渡卸), and jidaiemakijunkou (時代絵巻巡行). It is usually held in the middle of May, be sure to take part in this festival when you come to Sendai! (Resource : The Gate 12)



Come and visit the Sendai Aoba festival held in Sendai city!